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UTILITY PATENT APPLICATION TRANSMITTAL

Mail Date October 11, 2000

| | | | |
|---|---|--------------|---|
| Attorney Docket No.: | PT03191UC01 | Total Pages: | 2 |
| First-Named Inventor or Application Identifier | Suarez et al. | | |
| Title: | METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH SYSTEM | | |
| Express Mail Label No.: | | | |

(Only for new nonprovisional applications under 37 CFR 1.53(b))

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|---|--------------------|--|
| APPLICATION ELEMENTS (see MPEP chapter 600 concerning utility patent application contents) | ADDRESS TO: | Assistant Commissioner for Patents Box Patent Application Washington, D.C. 20231 |
|---|--------------------|--|

1. ☒ Fee Transmittal Form in duplicate
2. ☒ Specification Total Pages
3. ☒ Drawings Total Sheets:
4. ☒ Oath or Declaration with Power of Attorney Total Pages
 - a. ☒ Newly Executed (original or copy)
 - b. ☐ Copy from prior application (37 CFR §1.63(d))
(for continuation/divisional with Box 17 completed)
 - i. ☐ Deletion of Inventor(s):
Signed statement attached deleting inventor(s) named in the prior application
(see 37 CFR §1.63(d)(2) and 1.33(b))
5. ☐ Incorporation by Reference (*useable if Box 4b is checked*)
The entire disclosure of the prior application, from which a copy of the oath or declaration is
supplied under Box 4b, is considered as being part of the disclosure of the accompanying
application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (*cover sheet and document(s)*)
9. ☐ 37 CFR §3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
10. ☐ English Translation Document (*if applicable*)
11. ☒ Information Disclosure Statement ☒ Copies of IDS Citations
(IDS)/PTO-1449
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) (*should be specially itemized*)
14. ☐ Small Entity Statements

| | |
|-----|---|
| 15. | <input type="checkbox"/> Certified Copy of Priority Document(s) |
| 16. | <input type="checkbox"/> Other: |
| 17. | <p>IF A CONTINUING APPLICATION <i>check appropriate box and supply the requisite information below and in a preliminary amendment:</i></p> <p> <input checked="" type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-Part (CIP) Prior Appl. No. 09/366,422 </p> <p> Prior Appl. information: Examiner: E. Gary Group/Art Unit: 2744 </p> |

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| DATE | Mail Date October 11, 2000 | Deposit account User ID 50-0757 |

UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S): Suarez et al.

TITLE: METHOD AND APPARATUS FOR COMMUNICATION WITHIN
A VEHICLE DISPATCH SYSTEM

Mail Date October 11, 2000

EXPRESS MAIL TRANSMITTAL SHEET

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I HEREBY CERTIFY that the following documents are enclosed and transmitted
herewith for filing in the United States Patent Office:

1. 25 page patent application
2. 12 sheets of informal/formal drawings
3. 4 page Combined Declaration and Power of Attorney
4. 4 page Assignment
5. 1 page Assignment Recordation Sheet
6. 2 page Information Disclosure Statement
7. 4 cited references
8. 1 page PTO Form 1449
9. 2 page Application Transmittal Letter
10. 2 page Fee Transmittal

Each document specifically listed above is being mailed by U.S. Postal Service Express
Mail to:

Box Patent Application
Assistant Commissioner for Patents
Washington, DC 20231

Date of Deposit:

October 11, 2000

Express Mail Label No.:

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Signature of person mailing papers:

Gail Marino

Printed name of person mailing papers:

Gail Marino



FEE TRANSMITTAL

PATENT

| | |
|-------------------------|--|
| Application Number | |
| Filing Date | |
| First-Named Inventor | Suarez et al. |
| Examiner Name | |
| Group/Art Unit | |
| Title: | METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH SYSTEM |
| Attorney Docket No. | PT03191UC01 |
| TOTAL AMOUNT OF PAYMENT | |
| | \$750.00 |

35 U.S. PTO
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METHOD OF PAYMENT

(check one)

FEE CALCULATION

(continued)

| 1. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to: | | 2. EXTRA CLAIM FEES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------|--|----------|-----------------|----------|-----------------|-----|--------------------|------------------------|-----|-----|----------------------------|-----|-----|---------------------------------------|------------------|----|--|-----|--------------------|---|-----|-----|------------------------|--|--------------|--|--|-------|---------------------|--|
| Deposit Account No. 50-0757 | | Deposit Account Name Motorola, Inc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Charge any additional Fee Required under 37 CFR § 1.16 and 1.17 | | <input type="checkbox"/> Charge the Issue Fee set in 37 CFR § 1.18 at the of the Mailing of the Notice of Allowance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FEE CALCULATION | | Large Entity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. BASIC FILING FEE | | <table border="1"> <thead> <tr> <th>Fee Code</th> <th>Fee (\$)</th> <th>Fee Description</th> </tr> </thead> <tbody> <tr> <td>103</td> <td>18</td> <td>Claims in excess of 20</td> </tr> <tr> <td>102</td> <td>80</td> <td>Ind. claims in excess of 3</td> </tr> <tr> <td>104</td> <td>270</td> <td>Multiple dependent claim, if not paid</td> </tr> <tr> <td>109</td> <td>80</td> <td>**Reissue independent claim over original patent</td> </tr> <tr> <td>110</td> <td>18</td> <td>**Reissue claims in excess of 20 and over original patent</td> </tr> </tbody> </table> | | Fee Code | Fee (\$) | Fee Description | 103 | 18 | Claims in excess of 20 | 102 | 80 | Ind. claims in excess of 3 | 104 | 270 | Multiple dependent claim, if not paid | 109 | 80 | **Reissue independent claim over original patent | 110 | 18 | **Reissue claims in excess of 20 and over original patent | | | | | | | | | | |
| Fee Code | Fee (\$) | Fee Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103 | 18 | Claims in excess of 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | 80 | Ind. claims in excess of 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104 | 270 | Multiple dependent claim, if not paid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109 | 80 | **Reissue independent claim over original patent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 110 | 18 | **Reissue claims in excess of 20 and over original patent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Code</th> <th>Fee (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>690</td> <td>Utility filing fee</td> <td>\$710</td> </tr> <tr> <td>106</td> <td>310</td> <td>Design filing fee</td> <td></td> </tr> <tr> <td>107</td> <td>480</td> <td>Plant filing fee</td> <td></td> </tr> <tr> <td>108</td> <td>690</td> <td>Reissue filing fee</td> <td></td> </tr> <tr> <td>114</td> <td>150</td> <td>Provisional filing fee</td> <td></td> </tr> <tr> <td colspan="3">Subtotal (1)</td> <td>\$710</td> </tr> </tbody> </table> | | Code | Fee (\$) | Fee Description | Fee Paid | 101 | 690 | Utility filing fee | \$710 | 106 | 310 | Design filing fee | | 107 | 480 | Plant filing fee | | 108 | 690 | Reissue filing fee | | 114 | 150 | Provisional filing fee | | Subtotal (1) | | | \$710 | Subtotal (2) | |
| Code | Fee (\$) | Fee Description | Fee Paid | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | 690 | Utility filing fee | \$710 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106 | 310 | Design filing fee | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | 480 | Plant filing fee | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108 | 690 | Reissue filing fee | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 114 | 150 | Provisional filing fee | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subtotal (1) | | | \$710 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FEE CALCULATION | | FEE CALCULATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subtotal (1) | | (continued - next page) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Additional Fees (continued) | | Large Entity | |
|------------------------------|----------|--|----------------|
| Fee Code | Fee (\$) | Fee Description | Fee Paid |
| 105 | 130 | Surcharge - late filing fee or oath | |
| 127 | 50 | Surcharge - late provisional filing fee or cover sheet | |
| 139 | 130 | Non-English specification | |
| 147 | 2520 | For filing a request for reexamination | |
| 112 | 920* | Requesting publication of SIR prior to Examiner action | |
| 113 | 1840* | Requesting publication of SIR after Examiner action | |
| 115 | 110 | Extension for reply within first month | |
| 116 | 380 | Extension for reply within second month | |
| 117 | 870 | Extension for reply within third month | |
| 118 | 1360 | Extension for reply within fourth month | |
| 128 | 1850 | Extension for reply within fifth month | |
| 119 | 300 | Notice of Appeal | |
| 120 | 300 | Filing a brief in support of an appeal | |
| 121 | 260 | Request for oral hearing | |
| 138 | 1510 | Petition to institute a public use proceeding | |
| 140 | 110 | Petition to revive - unavoidable | |
| 141 | 1320 | Petition to revive - unintentional | |
| 142 | 1210 | Utility issue fee (or reissue) | |
| 143 | 430 | Design issue fee | |
| 144 | 580 | Plant issue fee | |
| 122 | 130 | Petitions to Commissioner | |
| 123 | 50 | Petitions related to provisional applications | |
| 126 | 240 | Submission of IDS | |
| 581 | 40 | Recording each patent assignment per property (times number of properties) | \$40.00 |
| 146 | 690 | Filing a submission after final rejection (37 CFR § 1.129(a)) | |
| 149 | 690 | For each additional invention to be examined (37 CFR § 1.129(b)) | |
| Other fee (specify) | | | |
| Other fee (specify) | | | |
| *Reduced by Basic Filing Fee | | | |
| Subtotal (3) | | | \$40.00 |

| SUBMITTED BY | | | |
|--------------|----------------------------|-------------------------|---------|
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| SIGNATURE | <i>Randi L. Dulaney</i> | | |
| DATE | Mail Date October 11, 2000 | Deposit Account User ID | 50-0757 |

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Registration Number Four:: 35155
Registration Number Five:: 33308
Registration Number Six:: 33739
Registration Number Seven:: 34413
Registration Number Eight:: 35743
Registration Number Nine:: 46148
Registration Number Ten:: 38529
Registration Number Eleven:: 37286
Registration Number Twelve:: 36453

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METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH SYSTEM

Background of the Invention

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Field of the Invention

This invention relates in general to vehicle dispatch systems, and in particular to the communication of assignment messages within vehicle dispatch systems.

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Description of the Related Art

A number of vehicle dispatch systems exist for the tracking and controlling of fleets such as taxicabs, delivery trucks, and the like. These systems typically communicate requests for dispatch to the vehicles in the fleet and then match acceptance of the request to the particular request. Key criteria of vehicle dispatch systems, whether manual or automatic, simple or complex, include the system cost, the system performance, and the fairness and timeliness of the selection process.

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Historically, two-way radio networks have been utilized for vehicle dispatch. Voice communication is the primary communication tool for information gathering and decision making relating to the distribution of assignments in these systems. A dispatch center broadcasts a message of a new assignment location either via a data network or a voice network to the drivers of the various vehicles in the fleet; and each individual driver replies with his/her acceptance or rejection of the assignment to the dispatch center. Typically, the driver's reply is accomplished via a voice network such as a cellular phone or two-way radio.

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There are several drawbacks to these vehicle dispatch systems. First, the driver must be alert at all times to listen to the assignment messages from the dispatch center and rapidly determine if the assignment location is within his/her range. The driver must make a quick decision for each message of whether to accept the job or not. In some fleets, if the driver affirmatively replies to the dispatch center and then does not get to the assignment location within a pre-

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determined amount of time he can be fined. The combination of the rapid assignment messaging and decision-making and the potential for fines creates high stress levels in the drivers of the vehicles.

- A second drawback of the traditional vehicle dispatch systems is that some of the drivers will answer any call, even if not close to the assignment location, motivated by a desire to maximize income or challenge the system. This creates an environment wherein the customer suffers from not receiving the most rapid service. Further, drivers from competing fleets can monitor the frequency of message transmission with a scanner and “steal” the assignments from the drivers who the message was targeted to reach.

- Further, the broadcast of the assignment message in traditional vehicle dispatch systems is made throughout the entire territory covered by the fleet. In areas where there is a shortage of radio frequency channels, the available channels are rapidly filled to capacity. The expense of maintaining existing channels and/or petitioning the local government for new channels can be out of reach for many dispatch businesses.

- Today, vehicle dispatch systems designed to alleviate some of the previously described drawbacks typically focus communications and decision-making at the dispatch center. Information such as geographical location and current job status of a selected vehicle is established; and then decisions regarding sending the current dispatch message to that selected vehicle are made by comparing that information either manually or automatically to some pre-defined criteria in the dispatch center. Automatic vehicle locator systems that automatically track the location of managed vehicles and then report this information to a dispatcher are frequently utilized. Advanced automatic vehicle locator systems further automatically identify the nearest vehicle to a location to further facilitate the dispatcher's accuracy. In some systems, the geographical location is compared to known locations of authorized vehicles and dispatch of the message is denied to the selected vehicle if the selected vehicle's location does not correspond to one of the known locations.

Other vehicle dispatch systems automatically assign jobs to the closest available vehicle and then inform the driver of the assignment via some other channel, such as the driver's mobile pager. In this method, no assurance is given

that the driver receives the notification or is actually available to take the assignment. The driver actually has no method to decline the assignment in this type of system.

The drawback of all of these systems is that the control rests within the dispatch center completely and the complexity of the system communications is increased greatly. Further the channel utilization increases since each call must be sent individually to each selected driver. Lastly, the systems still rely heavily on the dispatcher to make decisions and perform monitoring of the vehicles. This leads to a high degree of errors and confusion.

What is needed is a method to reduce the loading of the channels used for vehicle dispatch, reduce the decision-making stress on the vehicle drivers, and at the same time retain the automatic sorting mechanisms of the dispatch center - based systems.

Brief Description of the Several Views of the Drawings

FIG. 1 is a block diagram of a vehicle dispatch system;

FIG. 2 is an electrical block diagram of a wireless communication device for use within the vehicle dispatch system of FIG. 1;

FIG. 3 is an illustration of an assignment message for communication within the vehicle dispatch system of FIG. 1;

FIGs. 4, 5, and 6 illustrate various decision-making criteria for use within the wireless communication device of FIG. 2;

FIGs. 7, 8, and 9 are electrical block diagrams of alternate embodiments of the wireless communication device of FIG. 2;

FIGs. 10 and 11 are flowcharts illustrating the operation of the wireless communication device of FIG. 2 in accordance with the present invention;

FIG. 12 is a flowchart illustrating more detail of the operation of FIGs. 10 and 11;

5 FIG. 13 is a flowchart of the operation of a dispatch center for use within the vehicle dispatch system of FIG. 1;

FIG. 14 is an alternate embodiment of the assignment message of FIG. 3; and

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FIGs. 15, 16, and 17 illustrate various decision making criteria for use within the vehicle dispatch system of FIG. 1.

FIG. 1

Detailed Description of the Invention

Referring to FIG. 1, a vehicle dispatch system **10** for the management of a fleet **12** of vehicles **14** such as taxicabs, delivery trucks and the like is illustrated. The vehicle dispatch system **10** comprises a message input device **24**, such as a telephone or computer terminal, connected through a conventional public switched telephone network (PSTN) **30** by a plurality of conventional telephone links **26** to a dispatch center **16**. It will be appreciated by one skilled in the art that the message input device **24** may also communicate with the dispatch center **16** via alternative communication means such as radio frequency (RF) channels, satellite links, or Internet.

The dispatch center **16** functions in a wide variety of manners ranging from fully manual systems to automatic systems employing complex tracking methods. The dispatch center **16** includes a dispatch controller **18**, a dispatch transmitter **20**, and a dispatch receiver **22**. The dispatch controller **18** oversees the operation of the dispatch transmitter **20** and the dispatch receiver **22** through one or more communication links **42**, which typically are conventional telephone links, and additionally can include RF, microwave, or other high quality audio communication links. The dispatch controller **18** encodes inbound requests for dispatch **28** into outbound assignment messages **32**, and decodes inbound replies **38** from the vehicles **14** for matching of a request for dispatch **28** with a vehicle **14** that affirmatively replies. The dispatch controller **18** preferably includes a timer **19** for managing the scheduling of assignments. The dispatch controller **18** schedules the assignment message **32** for transmission by the dispatch transmitter **20**, via a transmit antenna **34**, to each vehicle **14** of the fleet **12** on at least one outbound radio frequency (RF) channel such as a first communication channel **35**. Each vehicle **14** includes a wireless communication device **36** capable of receiving and processing the assignment messages **32**.

It will be appreciated that the vehicle dispatch system **10** may function utilizing any wireless RF channel for the first communication channel **35**, for example, a one or two way pager channel, a mobile cellular channel, or a mobile

radio channel. In the following description, the RF communication channel refers to any of the wireless RF channels listed above or an equivalent. Each wireless communication device **36** assigned for use in the vehicle dispatch system **10** has an address **48** assigned thereto, which is a unique selective call address. The address **48** enables the transmission of the assignment message **32** from the dispatch controller **18** only to the addressed wireless communication device **36**. The address **48** also identifies the replies **38** sent by the wireless communication device **36** over at least one outbound radio frequency (RF) channel such as a second communication channel **39**; and received at the dispatch controller **18** through the dispatch receiver **22** via a receive antenna **40**. A list of the assigned addresses for each of the wireless communication devices **36** is stored in the dispatch controller **18** in the form of a vehicle subscriber database.

FIG. **2** is an electrical block diagram of a wireless communication device **36** for use within the vehicle dispatch system **10** of FIG. **1**. The wireless communication device **36** includes an antenna **44** for intercepting transmitted signals from the dispatch center **16** of the vehicle dispatch system **10**. The antenna **44** is coupled to a receiver **46** employing conventional demodulation techniques for processing the communication signals received from the dispatch center **16** such as the assignment message **32**. The receiver **46** is capable of receiving and demodulating voice as well as data signals.

FIG. **3** is an illustration of the assignment message **32** for communication with the wireless communication device **36** of FIG. **2**. The assignment message **32** preferably includes an address **48**, a location parameter **50**, and a data **52**. The address **48** identifies the wireless communication device **36** for which the assignment message **32** is directed. The location parameter **50** identifies the geographical location of the assignment being transmitted in the data **52** of the assignment message **32**. The data **52** includes all details of the assignment such as customer name, number of passengers, the required time of pick-up, etc.

Referring back to FIG. **2**, coupled to the receiver **46** is an assignment manager **58** utilizing conventional signal processing techniques for processing the received assignment messages. Preferably, the assignment manager **58** is similar to the MC68328 micro-controller manufactured by Motorola, Inc. of

Once the assignment manager **58** determines that the assignment message **32** should be processed, it sends the assignment message **32** to the processor **60**. Upon receipt of the assignment message **32**, the processor **60** stores the assignment message **32** in the memory **54**. The processor **60** also sends a command to an alerting device **64** to notify the driver of the vehicle **14** in which the wireless communication device **36** is located that the assignment message **32** has been received. In one embodiment, the alerting device **64** comprises a speaker and associated speaker drive circuitry capable of playing both melodies and voice recordings. Upon receiving a command from the processor **60** to play a message receipt alert, the alerting device **64** plays an audible alert. The driver then chooses to review the data **52** of the assignment message **32** on a display screen in the case of data messages or play the recorded voice message in the case of voice messages.

The alerting device **64**, in another embodiment, includes a display to generate a visual notification of the assignment message receipt. When the display receives the command from the processor **60** that the assignment message **32** has been received and stored in memory **54**, a message indication is displayed. The message indication, for example may be the activation of one of a plurality of message icons. Selection by the driver of the message indicator associated with the assignment message **32** will display the data **52** of the assignment message **32** on the screen in the case of data messages and play the recorded voice message in the case of voice messages. Alternatively, the data **52** of the assignment message **32** is displayed on the display screen in response to a command from the processor **60** with no required input from the driver. The display may be, for example, a full or partial starburst liquid crystal display. It will be appreciated that other similar displays can be utilized for the display.

Preferably, the assignment manager **58** is programmed to include a criteria parameter **62** for comparison of the location parameter **50** of the assignment message **32** with a current location **56** stored in the memory **54**. When the location parameter **50** corresponds to the current location **56**, the assignment manager **58** passes the assignment message **32** to the processor **60** for message processing.

The criteria parameter **62** is a pre-set metric for filtering the assignment message **32** received by the wireless communication device **36** to be seen only by the vehicles **14** within the fleet **12** that meet the specified criteria. The criteria parameter **62** may be a calculation, an equation, a function, or a comparison value. The criteria parameter **62** may be changed in response to receipt of a programming message, in response to a timer timeout, or in response to a direct reprogramming of the assignment manager **58**.

Utilization of a criteria parameter within an assignment manager included within a wireless communication device greatly reduces the burden of the vehicle driver by filtering out assignments automatically that are outside his/her current range of assignment acceptance. The criteria parameter is programmable and therefor may be changed by the driver or by the fleet manager as required. Further, by placing the decision within the vehicle, the dispatch center is alleviated

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of the task of tracking each vehicle in the fleet, greatly simplifying the operation of the dispatch center and at the same time reducing traffic congestion on the communication channels.

- FIGs. 4, 5, and 6 illustrate various metrics for the criteria parameter 62. It
- 5 will be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter 62. In FIG. 4, the criteria parameter 62 is a perimeter 68 surrounding the assignment location 66 established at a radius 70 from the assignment location 66. When the wireless communication device 36 receives the assignment message 32 including the location parameter 50, the assignment
- 10 manager 58 compares the location parameter 50 corresponding with the assignment location 66 to the current location 56 of the vehicle 14 in which the wireless communication device 36 resides. When the current location 56 is within the perimeter 68, the assignment message 32 will be sent to the processor 60 for further processing. When the current location 56 is not within the perimeter 68,
- 15 the assignment message 32 will be deleted, and the driver of the vehicle 14 would never even be aware that it was received, thereby reducing unnecessary message receipt by the driver of the vehicle.

- In FIG. 5, the criteria parameter 62 is a driving distance 72 away from the assignment location 66. Upon receipt of the assignment message 32, the
- 20 assignment manager 58 calculates the driving distance from the current location 56 of the vehicle 14 in which the wireless communication device 36 resides to the assignment location 66 that corresponds to the location parameter 50. When the calculated driving distance is within the driving distance 72 set for the criteria parameter 62 the assignment message 32 will be sent to the processor 60 for
- 25 further processing. When the calculated driving distance is not within the driving distance 72 set for the criteria parameter 62, the assignment message 32 will be deleted and the driver of the vehicle 14 would never even be aware that it was received. This process thereby limits the receipt of assignment messages by the vehicle driver to those within a reasonable driving distance.

- 30 Preferably, the assignment manager 58 includes a navigation program for the area in which the fleet 12 operates. The assignment manager 58 uses the

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navigation program to calculate the driving distance from the current location **56** to the assignment location **66**.

The filtering by driving distance and by perimeter from the assignment location eliminates problems of drivers affirmatively replying to assignment messages clearly outside their range for the purpose of maximizing their own income, thereby enhancing system performance and customer satisfaction.

In FIG. **6**, the criteria parameter **62** is the travel time **78** equal to the difference between an estimated arrival time **74** and a current time **76**. Upon receipt of the assignment message **32**, the assignment manager **58** determines the estimated arrival time **74** to the assignment location **66**. The current time **76** is subtracted from the estimated arrival time **74** to calculate a travel time. When the calculated travel time is within the travel time **78** assigned to the criteria parameter **62**, the assignment message **32** will be sent to the processor **60** for further processing. When the calculated travel time is not within the travel time **78** assigned to the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. This process thereby limits receipt of assignment messages by vehicle drivers to those that the driver could arrive at within a reasonable timeframe.

Preferably, the assignment manager **58** includes a smart program for tracking of traffic conditions coupled to the assignment manager **58**. The smart program calculates the travel time required based on the latest received traffic conditions. Alternatively, the assignment manager **58** may include a program incorporating average travel times and uses the average travel times to calculate the travel time from the current location **56** to the assignment location **66**.

The criteria parameter **62** alternatively further includes hours of operation for the vehicle **14**. The hours of operation in one embodiment are set by the driver of the vehicle at the beginning of each shift. Alternatively, the hours of operation are set either manually or automatically via the receipt of a message from the dispatch center. When the estimated arrival time does not fall between the hours of operation, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received.

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In another embodiment, the criteria parameter **62** is a type of vehicle that the driver of the vehicle **14** is using at that time. For example, passenger transportation fleets typically include limousines, cars, small cars, vans, and buses. When the location parameter **50** of the assignment message **32** is the number of passengers to be picked up and the criteria parameter **62** is the type of vehicle, the assignment message **32** is deleted if the number of passengers do not fit within that type of vehicle.

The examples above illustrate the variety of criteria parameter **62** programmed based on the type of fleet, type of business, and needs of the dispatch center. It will be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter **62**.

FIG. **7** is an alternate embodiment of the wireless communication device **36**. The reference numbers of the embodiment of FIG. **2** have been retained for those elements that are common. The wireless communication device **36** of FIG. **7** includes all the elements and functionality illustrated in FIG. **2** and further comprises a transmitter **80** and a device transmit antenna **82**.

The transmitter **80** is coupled to the processor **60** and is responsive to commands from the processor **60**. When the transmitter **80** receives a command from the processor **60**, the transmitter **80** sends the reply **38** via the device transmit antenna **82** to the dispatch center **16**. The reply **38** in one embodiment is transmitted over the first communication channel **35**, the same channel used to communicate the assignment message **32**. Using the same communication channel for both sets of communications eliminates the need for multiple channels and is desirable in regions where there is a shortage of available channels. In another embodiment, the reply **38** is transmitted over the second communication channel **39**. Using a different channel for the reply reduces the traffic on the first communication channel and is desirable in regions where the communication channels are congested.

The reply **38** preferably includes an affirmative indication to the dispatch center that the vehicle **14** containing the wireless communication device **36** will fulfill the assignment contained within the data **52** of the assignment message **32**. The reply **38** preferably also includes a vehicle identification and the vehicle's

current location **56** and estimated travel time **78** to the assignment location **66**. It will be appreciated that additional information may be included in the reply **38**.

FIG. **8** is an alternate embodiment of the wireless communication device **36**. The reference numbers of the embodiments of FIGs. **2** and **7** have been retained for those elements that are common. The wireless communication device **36** includes all the elements and functionality illustrated in FIG. **7** and further comprises a user interface **86**.

In the embodiment of FIG. **8**, after the processor **60** sends a command to the alerting device **64**, it waits for a user input **84** from the user interface **86**. The processor **60** commands the transmitter **80** to transmit a reply **38** via the device transmit antenna **82** in response to receipt of the user input **84** from the user interface **86**. The user interface **86** may be a button press, a series of button presses, a voice response by the driver of the vehicle **14**, or some other similar method of manual response initiated by the driver of the vehicle to the wireless communication device **36**.

Use of the user interface **86** leaves the control of acceptance or rejection of an assignment message with the driver of the vehicle while still filtering assignment messages obviously outside of his/her area. This two step filtering process: the first being automatic by the assignment manager and the second being manual via the user interface, gives the driver of the vehicle control of the matching of assignments, an improvement over the dispatch center – based systems which eliminate all driver control of assignment matches.

FIG. **9** is an alternate embodiment of the wireless communication device **36**. The reference numbers of the embodiment of FIG. **2** have been retained for those elements that are common. The wireless communication device **36** includes all the elements and functionality illustrated in FIG. **2** and further comprises a global positioning satellite (GPS) receiver **88** and GPS antenna **90**.

The Global Positioning System (GPS) is a worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations. GPS uses these "man-made stars" as reference points to calculate positions accurate to a matter of meters. The GPS receiver **88** uses the satellites in space as reference points for locations here on earth. The GPS receiver **88** measures distance using

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FIG. 10 is a flowchart illustrating the operation of the wireless communication device 36 in accordance with the present invention. As indicated in step 92 of FIG. 10, the wireless communication device 36 is normally in the standby mode for optimal power savings. In Step 94, the wireless communication device 36 periodically checks for receipt of the assignment message 32. When no assignment message 32 is received, the wireless communication device 36 returns to the standby mode of Step 92. In Step 96, when the assignment message 32 is received, the wireless communication device 36 checks for the presence of the location parameter 50 in the assignment message 32. In Step 98, when no location parameter 50 is included in the assignment message 32, the wireless communication device 36 implements whatever default instructions have been programmed into the assignment manager 58 and the processor 60. The default instruction, for example, may be the processing of the assignment message, the deletion of the assignment message, or the sending of a query for more information from the dispatch center. In Step 100, when the location parameter 50 is included in the assignment message 32, the assignment manager 58 compares the location parameter 50 to the current location 56 stored in the memory 54. When the location parameter 50 does not correspond to the current location 56, the wireless communication device 36 goes back to Step 92, the standby state operation. In Step 101, when the location parameter 50 corresponds

to the current location **56**, the processor **60** processes the assignment message **32**. The process then continues to node **B** as described in FIG. **12**.

Processing the assignment message **32** only upon a defined correspondence between the location parameter **50** and the current location **56** greatly reduces the assignment messages being received and processed by each individual driver. This automatic filter ensures the driver only is alerted to assignments in which there is a probability that he/she would be within the scope of the area of the assignment location.

FIG. **11** is a flowchart illustrating an alternate operation of the wireless communication device of FIG. **2** in accordance with the present invention. As indicated in step **92** of FIG. **10**, the wireless communication device **36** is normally in the standby mode for optimal power savings. In Step **94**, the wireless communication device **36** periodically checks for receipt of the assignment message **32**. When no assignment message **32** is received, the wireless communication device **36** returns to Step **92** in standby mode. When the assignment message **32** is received, the wireless communication device **36** proceeds to Step **96** and checks for the presence of the location parameter **50** in the assignment message **32**. In Step **98**, when no location parameter **50** is included in the assignment message **32**, the wireless communication device **36** implements whatever default instructions have been programmed into the assignment manager **58** and the processor **60**. In Step **102**, when the location parameter **50** is included in the assignment message **32**, the assignment manager **58** compares the location parameter **50** to the current location **56** stored in the memory **54** using the criteria parameter **62** contained within the assignment manager **58**. When the location parameter **50** does not meet the criteria parameter **62** in relation to the current location **56**, the wireless communication device **36** goes back to Step **92**, the standby state operation. In Step **103**, when the location parameter **50** does meet the criteria parameter **62** in relation to the current location **56**, the alerting device **64** is activated. The process then continues to node **C** as described in FIG. **12**.

FIG. **12** is a flowchart illustrating more detail of the operation of FIGs. **10** and **11**. Moving from node **B** to Step **104**, the system checks if the processor **60** is

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FIG. 13 is a flowchart of the operation of the dispatch center 16 for use within the vehicle dispatch system 10 of FIG. 1. In Step 118, the dispatch center 16 is in a standby state. In the standby state, the dispatch center 16 reduces its operation to draw less current and require less power to operate. In Step 120, the dispatch center 16 periodically checks for receipt of the request for dispatch 28. When no request for dispatch 28 is received, the dispatch center 16 returns to the standby state of Step 118. In Step 122, when a request for dispatch 28 is received by the dispatch center 16, the dispatch controller 18 of the dispatch center 16 generates the location parameter 50 identifying the assignment location 66 of the request for dispatch 28. In Step 123, the dispatch controller 18 sets the timer 19 for tracking

the time for processing of the request for dispatch **28** to matching of the assignment with the vehicle **14**. In Step **124**, the dispatch controller **18** sets a criteria parameter counter to $N = 1$. In Step **126**, the dispatch controller **18** generates the assignment message **32**.

5 FIG. **14** illustrates one embodiment of the assignment message **32**. The assignment message **32** preferably includes the address **48**, the location parameter **50**, a criteria parameter **62** and the data **52**. The address **48** identifies the wireless communication device **36** for which the assignment message **32** is directed. The location parameter **50** identifies the geographical location of the assignment being transmitted in the data **52** of the assignment message **32**. The data **52** includes all details of the assignment such as customer name, number of
10 passengers, the required time of pick-up, etc.

The criteria parameter **62**, as described previously, is a pre-set measurement for filtering the assignment message **32** received by the wireless communication device **36** to be seen only by the vehicles **14** within the fleet **12** that meet the specified criteria. The criteria parameter **62** may be a calculation, an equation, a function, or a comparison value. The dispatch controller **18** generates the criteria parameter **62** to be sent in the assignment message **32**. FIGs. **4**, **5**, and **6**, previously described, illustrate various metrics for the criteria parameter **62**. It will
15 be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter **62**.

Referring back to FIG. **13**, in Step **128** the dispatch controller **18** sends a command to the dispatch transmitter **20** to transmit the assignment message **32** via the transmit antenna **34** to each vehicle **14** of the fleet **12** on the first
25 communication channel **35**. The assignment message **32** is then sent to the vehicles **14** of the fleet **12** which each receive the assignment message **32** using the wireless communication device **36**. In Step **130**, the dispatch center **16** checks for receipt of the reply **38** by at least one vehicle **14**. The reply **38** is received by the dispatch center **16** via the receive antenna **40** to the dispatch
30 receiver **22**. The dispatch receiver **22** informs the dispatch controller **18** of receipt of the reply **38**. In Step **132**, when the reply **38** has been received, the dispatch controller **18** resets the timer **19**. The dispatch controller **18** then completes the

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assignment message **32** will be processed. When the current location **56** is not within the second perimeter **144**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received.

- When no reply **38** is received by the dispatch controller **18** indicating that no vehicle **14** is located within the second perimeter **144**, the dispatch controller **18** will generate a next criteria parameter ($N = 3$) and continue the process previously described until the reply **38** is received.

- In FIG. **16**, the criteria parameter **62** is first set at $N = 1$ to a first driving distance **148** away from the assignment location **66**. Upon receipt of the assignment message **32**, the wireless communication device **36** calculates the driving distance from the current location **56** of the vehicle **14** in which the wireless communication device **36** resides to the assignment location **66** that corresponds to the location parameter **50**. When the calculated driving distance is within the first driving distance **148** set for the criteria parameter **62** the assignment message **32** will be processed. When the calculated driving distance is not within the first driving distance **148** set for the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When the dispatch controller **18** does not receive the reply **38**, the criteria parameter **62** is set to $N = 2$ corresponding to a second driving distance **150** away from the assignment location **66**. The second driving distance **150** is preferably larger than the first driving distance **148**. Upon receipt of the assignment message **32**, the wireless communication device **36** calculates the driving distance from the current location **56** of the vehicle **14** in which the wireless communication device **36** resides to the assignment location **66** that corresponds to the location parameter **50**. When the calculated driving distance is within the second driving distance **150** set for the criteria parameter **62** the assignment message **32** will be processed. When the calculated driving distance is not within the second driving distance **150** set for the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When no reply **38** is received by the dispatch controller **18** indicating that no vehicle **14** is located within the second driving distance **150**,

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154 assigned to the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When the dispatch controller **18** does not receive the reply **38**, the criteria parameter **62** is set to $N = 2$ corresponding to a second travel time **158** to the assignment location **66** equal to the difference between a second arrival time **156** and the current time **76**. The second travel time **158** is preferably larger than the first travel time **154**. Upon receipt of the assignment message **32**, the wireless communication device **36** calculates its estimated arrival time to the assignment location **66**. The current time **76** is subtracted from the estimated arrival time to calculate a travel time. When the calculated travel time of the vehicle **14** is within the second travel time **158** assigned to the criteria parameter **62**, the assignment message **32** will be processed. When the calculated travel time is not within the second travel time **158** assigned to the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When no reply **38** is received by the dispatch controller **18** indicating that no vehicle **14** is located within the second driving distance **150**, the dispatch controller **18** will generate a next criteria parameter ($N = 3$) and continue the process previously described until the reply **38** is received.

Preferably, the wireless communication device **36** includes a smart program for tracking of traffic conditions. The smart program calculates the travel time required based on the latest received traffic conditions. Alternatively, the wireless communication device **36** may include a program incorporating average travel times and uses the average travel times to calculate the travel time from the current location **56** to the assignment location **66**.

The invention as described eliminates many of the drawbacks of existing vehicle dispatch systems. The invention reduces the traffic congestion on the communication channels and also reduces the frequency of messages received by the vehicle driver. The invention further reduces the potential for abuse of the system from drivers accepting assignments outside their range of travel. Overall, the system and method described reduces system costs, improves system performance, and improves customer satisfaction, the most important aspects of a vehicle dispatch system.

Although the invention has been described in terms of preferred embodiments, it will be obvious to those skilled in the art that various alterations and modifications may be made without departing from the invention. Accordingly, it is intended that all such alterations and modifications be considered as within the spirit and scope of the invention as defined by the appended claims.

CLAIMS

What is claimed is:

1. In a vehicle dispatch system having a dispatch center and a plurality of
5 wireless communication devices, a method for communication between the
dispatch center and the plurality of wireless communication devices
comprising:
receiving a request for dispatch including an assignment location;
generating an assignment message including a location parameter, wherein
10 the location parameter corresponds to the assignment location; and
sending an assignment message including a location parameter from the
dispatch center to the plurality of wireless communication devices,
wherein the assignment message is a wireless message transmitted
from the dispatch center to the wireless communication device over
15 a radio frequency channel, and further wherein each wireless
communication device having a current location:
receives the assignment message including the location
parameter from the dispatch center,
compares the location parameter to the current location of the
20 wireless communication device,
processes the assignment message when the location
parameter corresponds to the current location of
the wireless communication device, and
automatically deletes the assignment message when
25 the location parameter does not correspond to the current
location of the wireless communication device.
2. A method for communication between the dispatch center and a plurality of
wireless communication devices as recited in Claim 1 further comprising:
30 generating an alert in response to the processing of the assignment message.

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3. A method for communication between the dispatch center and a plurality of wireless communication devices as recited in Claim 2 further comprising: transmitting a reply to the dispatch center.
- 5 4. A method for communication between the dispatch center and a plurality of wireless communication devices as recited in Claim 3 wherein the reply is transmitted in response to a user input.
- 10 5. A method for communication between the dispatch center and a plurality of wireless communication devices as recited in Claim 3 wherein the assignment message is received on a first communication channel and the reply is transmitted on a second communication channel.

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7. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 6 wherein the matching criteria is a perimeter surrounding the assignment location.
- 5 8. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 6 wherein the matching criteria is a driving distance from the assignment location.
9. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 6 wherein the matching criteria is a travel time to the assignment location.
- 10 10. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 6 further comprising:
- 15 transmitting a reply from the wireless communication device to the dispatch center in response to processing the assignment message.
11. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 10 wherein the reply is transmitted in response to a user input.
- 20 12. A method for communication between a dispatch center and a plurality of wireless communication devices as recited in Claim 10 wherein the assignment message is received on a first communication channel and the reply is transmitted on a second communication channel.
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METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH SYSTEM

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Abstract of the Disclosure

10 A method for communication within a vehicle dispatch system (10) wherein a wireless communication device (36) co-located with a vehicle (14) receives a location parameter (50) in an assignment message (32), compares the location parameter (50) to the current location (56) of the vehicle (14) and processes the assignment message (32) when the location parameter (50) corresponds to the current location (56). The wireless communication device (36) includes a receiver (46), a memory (54), an assignment manager (58), and a processor (60).

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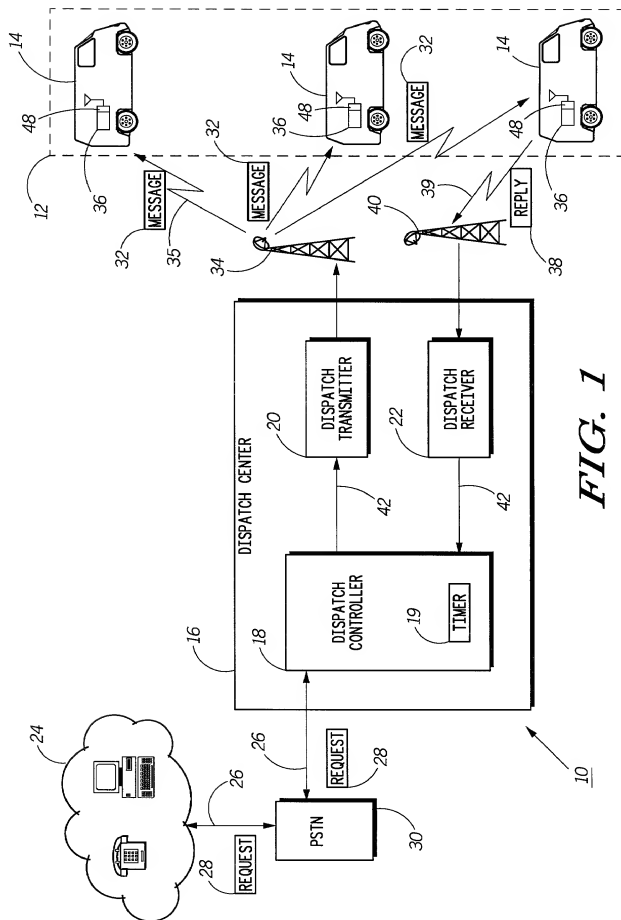
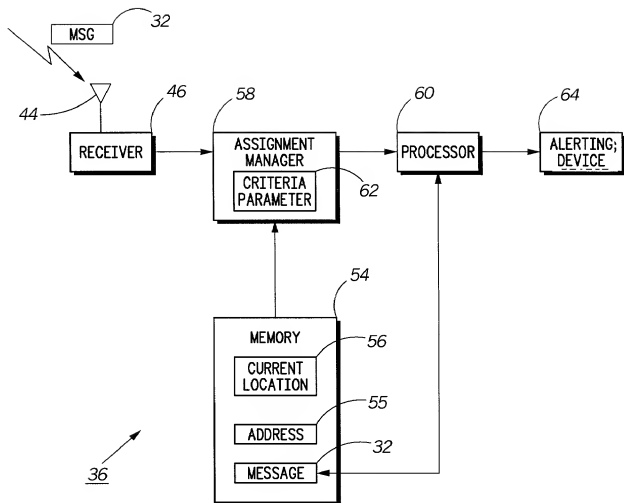
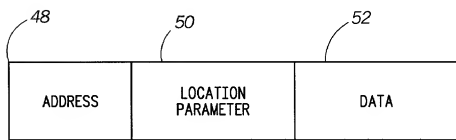
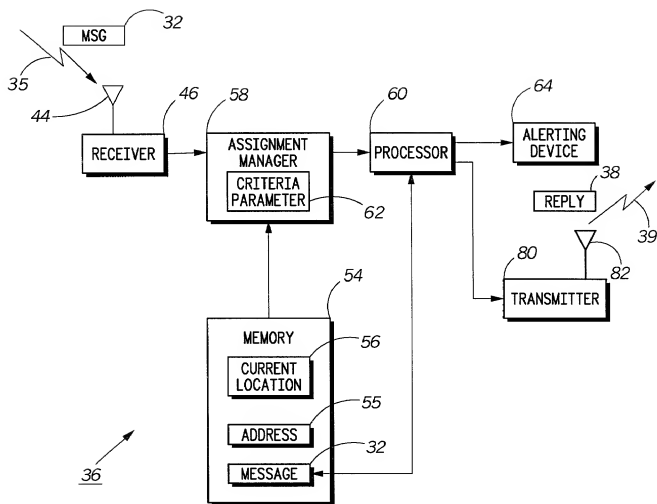


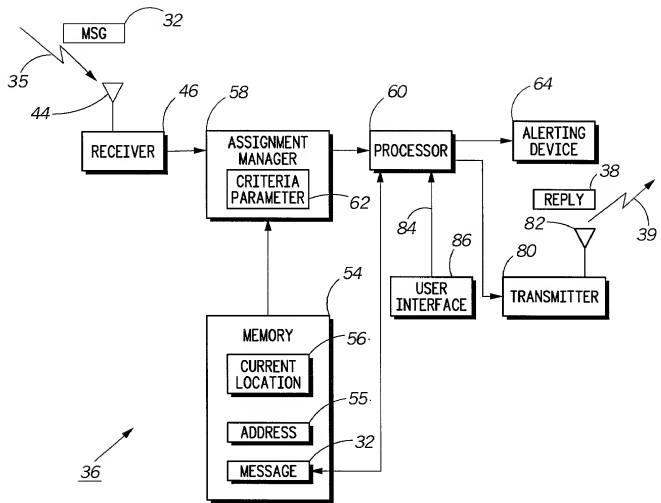
FIG. 1

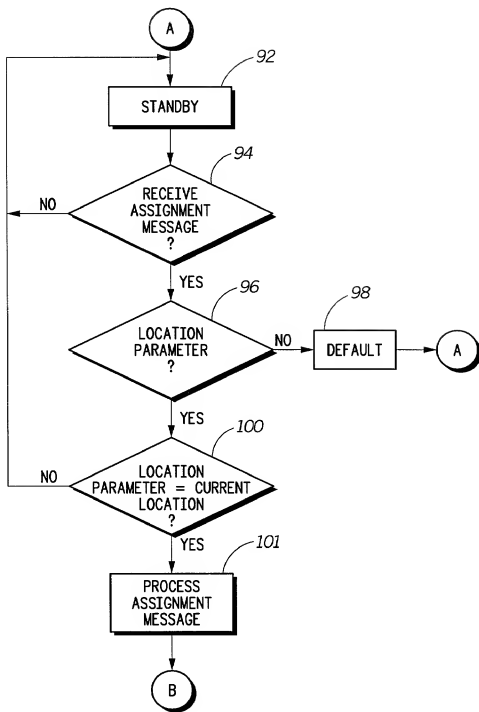
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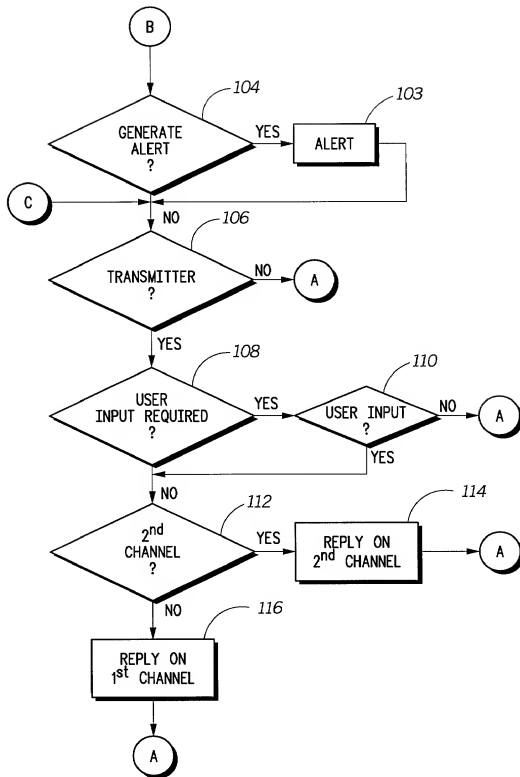
**FIG. 2****FIG. 3**



**FIG. 7**

**FIG. 8**

**FIG. 10**

**FIG. 12**

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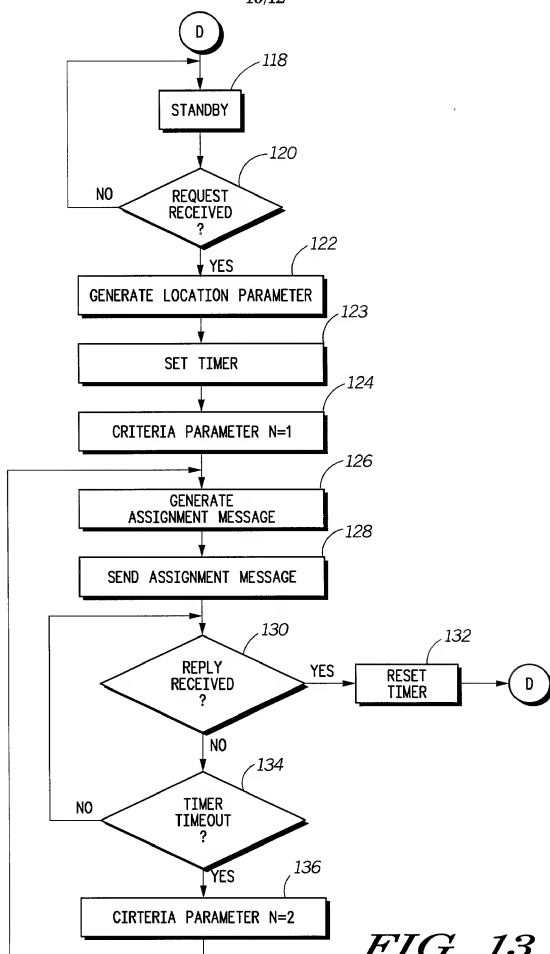
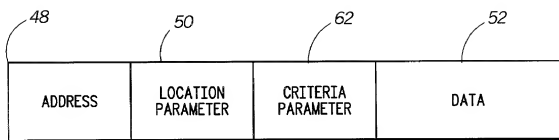


FIG. 13



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FIG. 14

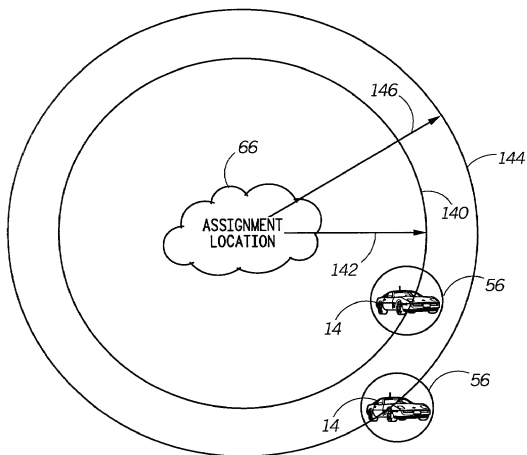
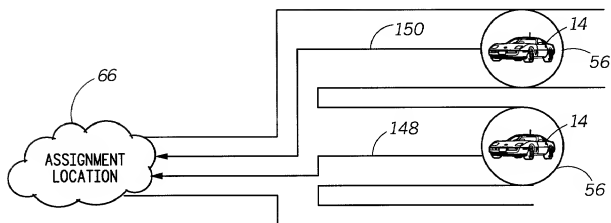
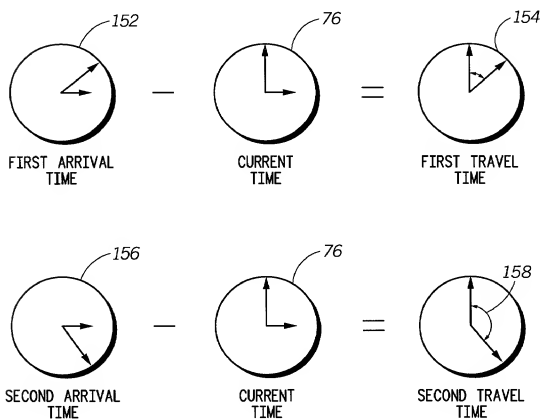


FIG. 15

**FIG. 16****FIG. 17**

PATENT APPLICATION DECLARATION
COMBINED WITH POWER OF ATTORNEY

Attorney's Docket No.: PT03191UC01



Regular (Utility)



Design Application

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH
SYSTEM

the specification of which:



is attached hereto



was filed on: _____

as U.S. Serial No.: _____

and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign/PCT Application(s):



no such application(s) filed



such application(s) identified as
follows:

| Application Number | Country | Date of Filing (day, month, year) | Priority Claimed Under 37 U.S.C. 119 | |
|--------------------|---------|--------------------------------------|---|-----------------------------|
| | | | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | | | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Provisional Application Serial No.:

Provisional Application Filing Date: _____

I hereby claim the priority benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which is material to the patentability of this application and which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Application(s):



no such application(s) filed



such application(s) identified as follows:

| Application No. | Filing Date (day, month, year) | Status (Patented, Pending, Abandoned) |
|-----------------|-----------------------------------|--|
| | | |
| | | |

I hereby declare that: as to any claimed subject matter of this application which is common to my earlier United States or foreign application(s), if any, which I have identified above and claimed the benefit of priority thereof, I do not believe that the same was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the first of said earlier application(s), or in public use or on sale in the United States more than one year prior to the first of said earlier application(s), and that the said common subject matter has not been patented or made the subject of an inventor's certificate before the date of the first of said earlier U.S. application(s) in any country foreign to the United States on an application, filed by me or my legal representatives or assigns more than twelve months (six months if the present application is a Design patent application) prior to the first of said earlier U.S. application(s), if any; and that, as to any claimed subject matter of this application which is not common to said earlier application(s), if any, I do not know and do not believe that the same was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months (six months if the present application is a Design patent application) prior to the date of this application.

I HEREBY APPOINT THE FOLLOWING AS MY ATTORNEY(S) OR AGENT(S) ASSOCIATED WITH CUSTOMER NUMBER 22926 WITH FULL POWER OF SUBSTITUTION TO PROSECUTE THIS APPLICATION AND TRANSACT ALL BUSINESS IN THE PATENT AND TRADEMARK OFFICE CONNECTED THEREWITH:

| NAME(S) | REG. NO.(S) | ASSOCIATE POWER OF ATTORNEY ATTACHED | |
|---------------------|-------------|--------------------------------------|--|
| Steven G. Parmelee | 28,790 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| J. Ray Wood | 36,062 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
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| M. Mansour Ghomeshi | 35,155 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
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| Gregg E. Rasor | 34,413 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Michael Zazzara | 35,743 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Randi L. Dulaney | 46,148 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| James A. Lamb | 38,529 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| R. Louis Breeden | 37,286 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Charlie Bethards | 36,453 | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

Send correspondence to:

| | |
|--|---|
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| Intellectual Property Section Law Department | Agent for Applicants |
| 1500 Gateway Blvd | Direct telephone calls to: (561) 739-2860 |
| Boynton Beach, FL 33426-8292 | Direct faxes to: (561) 739-2825 |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

| | | |
|--|--------------------------|--------------|
| Full name of first-named or sole inventor <u>GUSTAVO G. SUAREZ</u> | | |
| Inventor's signature <u><i>Gustavo Suarez</i></u> | Date <u>9/29/2000</u> | |
| Residence <u>Boca Raton</u> | FL | |
| City | State or Foreign Country | |
| Citizenship <u>United States</u> | Country | |
| Post Office Address <u>23325 Lago Mar Circle</u> | | |
| Street Address | | |
| <u>Boca Raton</u> | <u>FL</u> | <u>33433</u> |
| City | State or Country | Zip Code |

| | | |
|---|--------------------------|--------------|
| Full name of second-named joint inventor <u>CARLOS S. BARADELLO</u> | | |
| Inventor's signature <u><i>Carlos S. Baradello</i></u> | Date <u>9-26-00</u> | |
| Residence <u>Boca Raton</u> | FL | |
| City | State or Foreign Country | |
| Citizenship <u>Argentina/Italy</u> | Country | |
| Post Office Address <u>380 SE Mizner Blvd 1702</u> | | |
| Street Address | | |
| <u>Boca Raton</u> | <u>FL</u> | <u>33432</u> |
| City | State or Country | Zip Code |

| | | |
|---|--------------------------|--------------|
| Full name of third-named joint inventor <u>LEN DEBARROS</u> | | |
| Inventor's signature <u><i>Len Debarros</i></u> | Date <u>9-26-00</u> | |
| Residence <u>Delray Beach</u> | FL | |
| City | State or Foreign Country | |
| Citizenship <u>United States</u> | Country | |
| Post Office Address <u>941 Cypress Drive</u> | | |
| Street Address | | |
| <u>Delray Beach</u> | <u>FL</u> | <u>33483</u> |
| City | State or Country | Zip Code |